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ABSTRACT

This document, jointly developed by the Iowa Department of Public Instruction and a committee of the Iowa Council of Science Supervisors, is designed to encourage and aid local schools in assessing and revising their science curriculum on a continuous basis. Included are: (1) a schedule for conducting a science curriculum assessment and/or revision; (2) a model for assisting schools in developing their science philosophy, goals, and objectives; and (3) recommendations for levels at which suggested objectives are introduced, emphasized, and maintained. Also included are references and, in an appendix, an instrument for matching local science curriculum needs to available science programs. (JN)

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The Department of Public Instruction would also like to thank the 100 Iowa school districts and approximately 3,500 elementary and secondary teachers of science who assisted in developing and refining this tool during the 1978-79 academic year.

This tool was jointly developed by the Iowa Department of Public Instruction (DPI) and a committee of the Iowa Council of Science Supervisors (CS^2) to encourage and aid local schools in the assessment of their science curricula on a <u>continuous</u> basis. It provides:

- a schedule for conducting a science curriculum assessment and/or revision
- a model for assisting schools in developing their science philosophy, goals, and objectives
- recommendations for levels at which suggested objectives are introduced, emphasized and maintained
- an instrument for matching local science curriculum needs to available science programs

Implementation Schedule

(Summary)

Conducting a complete assessment, and revision, of the science curriculum is a time-consuming process. The utilization of this instrument for these processes generally requires 16-30 hours with the development committee.

		Proposed Data
1.	Select science curriculum committee	_____
2.	Schedule time and budget for curriculum work	_____
3.	Discuss current problems and trends in science education	_____
4.	Review rationale for science (page 8)	_____
5.	Review Iowa Code (page 9)	_____
*6.	Develop a philosophy of science teaching (page 11) and modify subgoals (page 12): Get feedback from staff and revise	_____
*7.	Modify objectives: Get feedback from staff and revise (page 13a - 18a)	_____
*8.	Decide on placement of objectives: Get feedback from staff and revise (page 12, 13b - 18b)	_____
*9.	Assess current program: Get feedback from staff and revise (page 12, 13c - 18c)	_____
10.	Decide on level of revision required	_____
11.	Assess physical facilities and recommend changes	_____
12.	Match curriculum needs to available curriculum materials	_____
13.	Present curriculum materials, under consideration, to staff	_____
14.	Visit other schools, utilizing materials being considered	_____
15.	Pilot curriculum materials in select classes	_____
16.	Notify administration of materials to be selected	_____

	Proposed Data
17. Provide teacher inservice of materials selected	_____
18. Evaluate new science curriculum	_____
19. Assess student achievement	_____
20. Arrange for regular curriculum review	_____

* These steps represent the care of the assessment process and may require separate meetings of 2-4 hours each

Implementation Schedule

It is important that all steps contained within this schedule are closely followed in the order in which they appear.

Proposed Data

1. Select Science Curriculum Committee

Establish a science curriculum committee with representatives from each of these areas:

Administration (principal, assistant superintendent, curriculum coordinator, counselors, school nurse, others as necessary).

Teachers of Science K-12 (all buildings represented)

Outside consultant (area education agency, college/university, DPI, others as necessary).

Others (men, women, diverse racial or ethnic groups, handicapped individuals and others, according to the Code of Iowa 257.25(11), 670-3.5(257).

_____

2. Schedule Time And Budget Finances For Curriculum Work

Schedule time and finances during the school year for curriculum planning, development, implementation, and evaluation.

_____

3. Discuss Current Problems And Trends In Science Education

Arrangements should be made for a knowledgeable consultant to speak with the committee concerning contemporary trends and problems in science education as they relate to the local district.

_____

Proposed Data

4. Review Rationale For Science

The science curriculum committee should carefully review the Rationale for science (page 8 of this document), and recommended minimum time allotments suggested for science, as they apply to the local district. _____

5. Review Iowa Code

The science curriculum committee should conduct a careful review of the Iowa Code (page 9 of this document) as it applies to the local district. _____

6. Develop A Philosophy Of Science Teaching: Feedback And Revision

Using the philosophy statement provided (page 11 of this document), the science curriculum committee should develop a local written philosophy of science education specific to local needs. The comprehensive nature of science and its essential purpose in developing scientific literacy in all students should be a major feature of the statement. The science curriculum committee should modify the subgoals provided in the tool (page 12 of this document) to assure consistency within the local philosophy. To assure application, subgoals should be included as an integral component of the philosophy. This philosophy statement should be duplicated and sent to the entire staff for reactions, additions, deletions, and corrections. _____

7. Modify Objectives: Feedback And Revision

Proposed Data

The science curriculum committee should modify the objectives provided in the tool (page 13a - 18a of this document). These objectives should represent the ideal curriculum and assure consistency with the goals developed in Step No. 6. Objectives should be added or deleted as appropriate. At this point, the objectives should be duplicated and sent to the entire science staff for additions, deletions, reactions, and corrections. Teachers' written comments, concerning the objectives should be encouraged in the white space provided on the right half of pages 13a - 18a.

_____

8. Placement Of Objectives: Feedback And Revision

The science curriculum committee should design the program by modifying the placement of the objectives within the K-12 tool provided (pages 12, 13b - 18b of this document). At this point, the suggested modifications should be duplicated and sent to the entire staff for reactions and corrections. Teachers should react to only those objectives which are specific to their teaching assignment. If teachers disagree with the suggested placement of objectives, appropriate alterations should be made. Consensus on placement should be reached by the curriculum committee based on suggestions made by the teachers.

_____

9. Assessment Of Current Program: Feedback And Revision

The curriculum committee should have teachers assess the degree to which each objective is emphasized in the present science program using pages 12, 13c - 18c of this document. Each teacher of science should decide the degree to which each objective is emphasized in his/her grade level or course by assessing each objective on the Likert Scale. Appropriate numbers should be circled. Teachers written comments concerning placement of the objectives in their present science program, should be encouraged in the white space provided on pages 13c - 18c.

_____

Proposed Data

10. Decide On Level Of Revision Required

If major weaknesses and duplications are identified in the program, the science curriculum committee should recommend a major revision. If only isolated weaknesses are identified, the committee may explore supplements to these areas only. Individual teachers should be encouraged to improve areas of weakness specific to their grade level or course.

_____

11. Assess Physical Facilities And Recommend Changes

A thorough assessment of the physical plant and facilities should be conducted, as these may limit the types of programs being considered. (Refer to Recommended Guidelines for Sites, Facilities, and Equipment - reference)

_____

12. Match Curriculum Needs With Available Curriculum Materials

A comparison of local science curriculum needs with those of available programs should be conducted. (Refer to "Matching Local Science Curriculum Needs to Available Science Programs" - appendix) Area Education Agency, Department of Public Instruction, college/university consultants and media services may be of assistance.

_____

13. Present To Science Staff Several Possible Programs

The science curriculum committee should arrange to present to the science staff the two or three programs whose philosophy, goals, and objectives most closely parallel those developed by the local staff. Department of Public Instruction, area education agency, or college/university consultants and commercial sales representatives may provide assistance.

_____

Proposed Data

14. Visit Other Schools

The science curriculum committee should be encouraged to visit a school, of similar size, which is currently utilizing the science materials being considered for adoption.

_____

15. Pilot Possible Programs — By Selected Teachers

The science curriculum committee should pilot science materials from one or more of the programs being considered for adoption, in one or two classes prior to district adoption.

_____

16. Notification To Administration

The science curriculum committee should inform appropriate administrators and/or school board members of the assessment and revision procedures and resultant materials selected.

_____

17. Provide Teacher Inservice of Materials Selected

_____

18. Evaluate Program

In order to assess improvement, the science curriculum committee should evaluate the new science program utilizing the Likert Scale (pages 13c - 18c of this document) one year after revision.

_____

19. Assess Student Achievement

Arrange for regular assessment of student achievement based upon objectives delineated (Project Measure - AEA 2, Locally developed tests, standardized tests.)

_____

20. Periodic Curriculum Review

The science curriculum committee should schedule regular meetings throughout the school year to discuss pros and cons of the new program.

_____

Rationale

Science education is essential in the total educational process. We live in a scientific and technological society, therefore science must occupy a place of prominence in the total curriculum.

SCIENCE EDUCATION IS THE STUDY OF THE PROCESSES OF INVESTIGATION, THE KNOWLEDGE SUCH INVESTIGATIONS PROVIDE, AND THE IMPACT AND USE OF SUCH KNOWLEDGE UPON THE INDIVIDUAL AND SOCIETY. THE SCIENCE CURRICULUM SHOULD REFLECT A BALANCE OF THESE THREE COMPONENTS.

The science curriculum and the science staff serve as interpreters of scientific information, theories, and research. As such they serve as the bridge between society (the public) and science (the scientists). They must reflect the nature of science, recent advances in science, and the societal pressures which affect both science and education. They must consider the personal needs of students and the societal issues of the time as they interpret science education in a manner necessary for a citizenry which is scientifically literate.

The science curriculum should be presented in a holistic and integrative manner that is tied to student needs, local situations, and societal issues. It should be experiential, whenever possible, so that students can practice essential skills.

Therefore, every student should receive a sequentially planned science program designed to develop scientific literacy. In addition, we recommend the minimum number of minutes per week allotted to science should be as follows:

K-3: 100 minutes/week
4-6: 150 minutes/week
7-9: 250 minutes or more/week
10-12: 250 minutes or more/week

Code of Iowa

The Code of Iowa provides minimum curriculum requirements and standards for approved schools (K-12).

MULTICULTURAL, NONSEXIST EDUCATION REQUIREMENT (IOWA SCHOOL STANDARDS)

Pursuant to the authority of section 257.25(11) of the Code of Iowa the following are additions to 670-3.5(257).

The curriculum structure and content, instructional materials, and teaching strategies shall reflect the contributions and perspectives of men and women and diverse racial or ethnic groups to the instructional program. Where sex or cultural-racial stereotyping exists in instructional materials, it shall be brought to the attention of the student and supplementary materials should be used to offset the stereotyping. Multicultural, nonsexist instructional materials shall be adopted at the first opportunity. The curriculum shall include activities which promote an awareness of sexism and cultural-racial bias in the English language.

670-3.5(6)

SECTION 257.25 STATES, WHERE APPLICABLE TO SCIENCE:

ELEMENTARY LEVEL

257.25(2) Kindergarten level. If a school offers a kindergarten program, the program shall include experiences designed to develop healthy emotional and social habits and growth in the language arts and communication skills, as well as a capacity for the completion of individual tasks, and protection and development of physical being.

257.25(3) Grades one through six. The following areas shall be taught in grades one through six:

SCIENCE, including conservation of natural resources and environmental awareness.

JUNIOR HIGH SCHOOL LEVEL

257.25(4) Grades seven and eight. The following shall be taught in grades seven and eight as a minimum program:

SCIENCE, including conservation of natural resources and environmental awareness

HIGH SCHOOL LEVEL

257.25(6a through 6j) Grades nine, ten, eleven and twelve. The minimum program for grades nine through twelve shall be:

SCIENCE (four units), including physics and chemistry; the units of physics and chemistry may be taught in alternate years

A Philosophy of Science Education

The following philosophy was formulated by the DPI/CS^2 development committee to serve as a guideline in refining local science philosophy (Step No. 6 on the Implementation Schedule).

Science education is the link between science and society. Its ultimate goal is to DEVELOP SCIENTIFICALLY LITERATE CITIZENS who use and understand the impact, knowledge and processes of science.

The study of science offers a KNOWLEDGE OF NATURAL PHENOMENA that uniquely rests upon the notion that humans can test and understand the orderly nature of the universe. Fundamental to this proposition is a need for students to develop and apply the logical thought PROCESSES OF SCIENCE AS PART OF THEIR BASIC LEARNING. These processes are best developed through a well-articulated science program that includes experimentation and manipulation of materials.

Science activities built upon each individual's natural curiosity become self motivating. This involvement can result in personal gain for students who discover and develop a confidence in their own ability to make decisions that form a basis for COMPREHENDING THE IMPACT of science and technology on the individual, culture and society.

A new generation of scientifically literate citizens is needed to cope with a future characterized by rapid change and a complex set of technical and ethical questions. Accordingly, it is recommended that all students receive an appropriate education in science to develop the intellectual skills that are basic to critical observation, problem resolution, decision-making and valuing.

Goal and Subgoals

The following goal and subgoals were formulated by the DPI/CS^2 development committee to serve as guidelines in refining local science goals (Step No. 7 on the Implementation Schedule).

Goal (K-12): 1. To develop a scientifically literate society.

Subgoals (K-12): A. To apply science processes as part of basic learning. (Objectives I-11)

B. To communicate knowledge of natural phenomena. (Objectives I-19)

C. To use scientific knowledge and processes, in comprehending the impact of science and technology on the individual, culture, and society. (Objectives 1-25)

Objectives

The following objectives, for subgoals A, B, and C, and their suggested placement in the curriculum were formulated by the DPI/CS^2 development committee, with suggestions from approximately 3,500 Iowa teachers of science, to serve as guidelines for local science curriculum (Steps No. 8, 9, and 10 on the Implementation Schedule).

Definition of Symbols

Suggested placement of objectives in the science curriculum:

I -- Introduce - The first time a topic is presented as a planned portion of the district science curriculum.

E -- Emphasize - The topic to be stressed.

M -- Maintain - Review and reinforce topics introduced previously.

M -- Not applicable at this level.

Degree to which the objective is emphasized in the science curriculum:

0	1	2	3	4
None	Very Little	Some	Quite a Bit	A Great Deal

Subgoal A

To apply science processes as a part of basic learning.

Process Objectives

1. To develop a student's observing skills. (Observing means using the senses to obtain information or data about objects and events.)

2. To develop a student's classifying skills. (Classifying is the process used to impose order on collections of objects and events to show similarities, differences, and interrelationships.)

3. To develop a student's measuring skills. (Measuring is the process of quantifying observations.)

4. To develop a student's recording skills. (Recording is the process of logical quantification and manipulation of data.)

5. To develop a student's predicting skills. (Predicting is the process of formulating a specific forecast based on observations, measurements and relationships between variables.)

6. To develop a student's inferring skills. (Inferring is the process of using logic to draw conclusions from data.)

Subgoal A

Process Objectives

7. To develop a student's hypothesizing skills. (Hypothesizing is the process of formulating testable scientific generalizations.)

8. To develop a student's investigating skills. (Investigating is the process of applying logical reasoning to solve new or unique problems.)

9. To develop a student's experimenting skills. (Experimenting is the process of using all the scientific processes in conducting a controlled test of specific scientific hypothesis.)

10. *To develop a student's decision-making skills. (Decision-making is the logical process of making a choice from alternatives.)

11. *To develop a student's valuing skills. (Valuing is the process of developing a position of commitment for personal actions.)

* These objectives are health related

Subgoal B

To communicate knowledge of natural phenomena of the universe such as:

Knowledge Objectives

1. Matter/energy relationships

2. The dynamic universe and solar system.

3. *The interaction and interdependence of living things with their environment.

4. *That living things are in continuous change evolution.

5. *That living organisms are the products of their heredity and environment.

6. That all matter consists of units.

7. *The personal aspects of physical, mental and community health and safety.

8. *The interaction of people with natural ecological systems.

9. Fundamental organic chemistry.

10. Fundamental inorganic chemistry.

11. The principles of magnetism and electricity.

12. The principles of energy origin, use, and alternatives.

13. The principles of atomic theory.

Subgoal B

Knowledge Objectives

14. Laboratory equipment, procedures and safety.

15. The periodic table.

16. The principles of continental drift.

17. The principles of mineralogy.

18. The principles of radioactive and physical dating.

19. The principles of geologic record.

20. The importance of the water and other cycles.

21. The conditions influencing weather.

22. Map construction and interpretation.

23. The finite nature of natural resources.

24. *The characteristics of living organisms.

25. *The cell as the basic unit of living organisms.

26. *The essential role of plants to all living things.

27. *The principles of human anatomy and physiology.

28. *The diversity of living forms.

29. *The functioning of simple machines.

* These objectives are health related.

Subgoal C

To use scientific knowledge in comprehending the impact of science and technology on the individual, culture, and society, such as:

Impact Objectives

1. Energy production and usage.
2. *Health and well-being.
3. Jobs and careers.
4. Natural resource use and management.
5. All living organisms within populations.
6. Various modes of transportation.
7. Weather modification.
8. *Genetic engineering.
9. *Chemical development and usage.
10. *Design and usage of computers.
11. Methods of communication.
12. *The amount, control and usage of pollution.
13. *Humankind aesthetically.
14. *Living organisms' reaction to stress.
15. *Use and/or misuse of drugs.
16. Humankind ethically.

Subgoal C

Impact Objectives

17. Housing.

18. *Food and nutrition.

19. Use and/or misuse of land.

20. *Amount and usage of leisure time.

21. Ventures in space.

22. Euthanasia or mercy killing.

23. *The ability of species to survive.

24. *Artifically induced life.

25. *Prosthetics or artificial body parts.

* These objectives are health-related.

Subgoal A

To apply science processes as a part of basic learning.	Suggested Placement of Process Objectives within Science Curriculum (K-3(4-6)(7-9)(10-12)			
Process Objectives				
1. To develop a student's observing skills. (Observing means using the senses to obtain information or data about objects and events.)	I	M	M	M
2. To develop a student's classifying skills. (Classifying is the process used to impose order on collections of objects and events to show similarities, differences, and interrelationships.)	I	E	E	E
3. To develop a student's measuring skills. (Measuring is the process of quantifying observations.)	I	E	E	E
4. To develop a student's recording skills. (Recording is the process of logical quantification and manipulation of data.)	I	M	E	E
5. To develop a student's predicting skills. (Predicting is the process of formulating a specific forecast based on observations, measurements and relationships between variables.)	I	E	E	E
6. To develop a student's inferring skills. (Inferring is the process of using logic to draw conclusions from data.)	I	M	E	E

Subgoal A

Suggested Placement of Process Objectives within Science Curriculum (K-3)(4-6)(7-9)(10-12)

Process Objectives

7. To develop a student's hypothesizing skills. (Hypothesizing is the process of formulating testable scientific generalizations.)	N	I	M	E
8. To develop a student's investigating skills. (Investigating is the process of applying logical reasoning to solve new or unique problems.)	I	E	E	E
9. To develop a student's experimenting skills. (Experimenting is the process of using all the scientific processes in conducting a controlled test of a specific scientific hypothesis.)	N	I	M	E
10. To develop a student's decision-making skills. (Decision-making is the logical process of making a choice from alternatives.)	I	E	M	M
11. To develop a student's valuing skills. (Valuing is the process of developing a position of commitment for personal actions.)	I	E	M	M

Subgoal B

To communicate knowledge of natural phenomena of the universe, such as:	Suggested Placement of Knowledge Objectives within Science Curriculum (K-3)	(4-6)	(7-9)	(10-12)
Knowledge Objectives				
1. Matter/energy relationships.	I	E	E	E
2. The dynamic universe and solar system.	N	I	E	M
3. The interaction and interdependence of living things with their environment.	I	E	E	M
4. That living things are in continuous change.	I	E	E	E
5. That living organisms are the products of their heridity and environment.	N	I	E	E
6. That all matter consists of units.	I	E	E	E
7. The personal aspects of physical, mental and community health and safety.	I	E	E	E
8. The interaction of people with natural ecological systems.	I	E	E	E
9. Fundamental organic chemistry.	N	N	N	I
10. Fundamental inorganic chemistry.	N	I	E	E
11. The principles of magnetism and electricity.	N	I	E	E
12. The principles of energy origin, use, and alternatives.	I	E	E	E
13. The principles of atomic theory.	N	I	E	E

Subgoal B

Suggested Placement of Knowledge Objectives within Science Curriculum (K-3)(4-6)(7-9)(10-12)

Knowledge Objectives

14. Laboratory equipment procedures and safety.	I	E	E	E
15. The periodic table.	N	N	I	E
16. The principles of continental drift.	N	N	I	E
17. The principles of mineralogy.	N	I	E	M
18. The principles of radioactive and physical dating.	N	N	I	E
19. The principles of geologic record.	N	I	E	M
20. The importance of the water and other cycles.	N	I	E	E
21. The conditions influencing weather.	N	I	E	E
22. Map construction and interpretation.	N	I	E	E
23. The finite nature of natural resources.	I	E	E	E
24. The characteristics of living organisms.	I	M	E	E
25. The cell as the basic unit of living organisms.	N	I	E	M
26. The essential role of plants to all living things.	I	M	E	E
27. The principles of physiology.	N	I	E	E
28. The diversity of living forms.	I	M	E	E
29. The functioning of simple machines.	I	M	E	E

Subgoal C

To use scientific knowledge in comprehending the impact of science and technology on the individual, and society, such as:

Suggested Placement of Impact Objectives within Science Curriculum (K-3)(4-6)(7-9)(10-12)

Impact Objectives

1. Energy production and usage.	N	I	E	E
2. Health and well-being.	I	E	E	E
3. Jobs and careers.	N	I	E	E
4. Natural resource use and management.	I	E	E	M
5. All living organisms within populations.	I	E	E	E
6. Various modes of transportation.	N	I	E	E
7. Weather modification.	N	I	E	E
8. Genetic engineering.	N	N	I	E
9. Chemical development and usage.	N	I	E	E
10. Design and usage of computers.	N	I	M	E
11. Methods of communication.	I	M	E	E
12. The amount, control and usage of pollution.	I	M	E	E
13. Humankind aesthetically.	I	M	E	E
14. Living organisms' reaction to stress.	N	I	E	E
15. Use and/or misuse of drugs.	I	E	E	E
16. Humankind ethically.	I	E	E	E

Subgoal C

Impact Objectives	Suggested Placement of Impact Objectives within Science Curriculum (K-3)	(4-6)	(7-9)	(10-12)
17. Housing	I	E	E	E
18. Food and nutrition.	I	E	E	E
19. Use and/or misuse of land.	I	E	E	E
20. Amount and usage of leisure time.	I	E	E	E
21. Ventures in space.	N	I	E	M
22. Euthansia or mercy killing.	N	N	I	E
23. The ability of species to survive.	I	E	E	E
24. Artificially induced life.	N	N	I	E
25. Prosthetics or artificial body parts.	N	N	I	E

Subgoal A

To apply science processes as a part of basic learning.

Process Objectives	Suggested Placement of Process Objectives within Science Curriculum (K-3)(4-6)(7-9)(10-12)				Degree to Which the Objective Is Emphasized in the Present Science Program(s) Write in the Grade Level and Program Being Assessed: _____				
1. To develop a student's observing skills. (Observing means using the senses to obtain information or data about objects and events.)	I	M	M	M	0	1	2	3	4
2. To develop a student's classifying skills. (Classifying is the process used to impose order on collections of objects and events to show similarities, differences, and interrelationships.)	I	E	E	E	0	1	2	3	4
3. To develop a student's measuring skills. (Measuring is the process of quantifying observations.)	I	E	E	E	0	1	2	3	4
4. To develop a student's recording skills. (Recording is the process of logical quantification and manipulation of data.)	I	M	E	E	0	1	2	3	4
5. To develop a student's predicting skills. (Predicting is the process of formulating a specific forecast based on observations, measurements and relationships between variables.)	I	E	E	E	0	1	2	3	4
6. To develop a student's inferring skills. (Inferring is the process of using logic to draw conclusions from data.)	I	M	E	E	0	1	2	3	4

Subgoal A

Process Objectives	Suggested Placement of Process Objectives within Science Curriculum (K-3)(4-6)(7-9)(10-12)				Degree to Which the Objective Is Emphasized in the Present Science Programs(s) Write in the Grade Level and Program Being Assessed: _____ _____				
7. To develop a student's hypothesizing skills. (Hypothesizing is the process of formulating testable scientific generalizations.)	N	I	M	E	0	1	2	3	4
8. To develop a student's investigating skills. (Investigating is the process of applying logical reasoning to solve new or unique problems.)	I	E	E	E	0	1	2	3	4
9. To develop a student's experimenting skills. (Experimenting is the process of using all the scientific processes in conducting a controlled test of a specific scientific hypothesis.)	N	I	M	E	0	1	2	3	4
10. To develop a student's decision-making skills. (Decision-making is the logical process of making a choice from alternatives.)	I	E	M	M	0	1	2	3	4
11. To develop a student's valuing skills. (Valuing is the process of developing a position of commitment for personal actions.)	I	E	M	M	0	1	2	3	4

Subgoal B

To communicate knowledge of natural phenomena of the universe such as:	Suggested Placement of Knowledge Objectives within Science Curriculum (K-3)	(4-6)	(7-9)	(10-12)	Degree to Which the Objective is Emphasized in the Present Science Program(s) Write in the Grade Level and Program Being Assessed:				
Knowledge Objectives									
1. Matter/energy re-relationships.	I	E	E	E	0	1	2	3	4
2. The dynamic universe and solar system.	N	I	E	M	0	1	2	3	4
3. The interaction and interdependence of living things with their environment.	I	E	E	M	0	1	2	3	4
4. That living things are in continuous change.	I	E	E	E	0	1	2	3	4
5. That living organisms are the products of their heredity and environment.	N	I	E	E	0	1	2	3	4
6. That all matter consists of units.	I	E	E	E	0	1	2	3	4
7. The personal aspects of physical, mental and community health and safety.	I	E	E	E	0	1	2	3	4
8. The interaction of people with natural ecological systems.	I	E	E	E	0	1	2	3	4
9. Fundamental organic chemistry.	N	N	N	I	0	1	2	3	4
10. Fundamental inorganic chemistry.	N	I	E	E	0	1	2	3	4
11. The principles of magnetism & electricity.	N	I	E	E	0	1	2	3	4
12. The principles of energy origin, use, and alternatives.	I	E	E	E	0	1	2	3	4
13. The principles of atomic theory.	N	I	E	E	0	1	2	3	4

Subgoal B

Knowledge Objectives	Suggested Placement of Knowledge Objectives within Science Curriculum (K-3)	(4-6)	(7-9)	(10-12)	Degree to Which the Objective Is Emphasized in the Present Science Program(s) Write in the Grade Level and Program Being Assessed:				
14. Laboratory equipment procedures and safety.	I	E	E	E	0	1	2	3	4
15. The periodic table.	N	N	I	E	0	1	2	3	4
16. The principles of continental drift.	N	N	I	E	0	1	2	3	4
17. The principles of mineralogy.	N	I	E	M	0	1	2	3	4
18. The principles of radioactive & physical dating.	N	N	I	E	0	1	2	3	4
19. The principles of geologic record.	N	I	E	M	0	1	2	3	4
20. The importance of the water & other cycles.	N	I	E	E	0	1	2	3	4
21. The conditions influencing weather.	N	I	E	E	0	1	2	3	4
22. Map construction and interpretation.	N	I	E	E	0	1	2	3	4
23. The finite nature of natural resources.	I	E	E	E	0	1	2	3	4
24. The characteristics of living organisms.	I	M	E	E	0	1	2	3	4
25. The cell as the basic unit of living organisms.	N	I	E	M	0	1	2	3	4
26. The essential role of plants to all living things.	I	M	E	E	0	1	2	3	4
27. The principles of human anatomy and physiology.	N	I	E	E	0	1	2	3	4
28. The diversity of living forms.	I	M	E	E	0	1	2	3	4
29. The functioning of simple machines.	I	M	E	E	0	1	2	3	4

Subgoal C

To use scientific knowledge in comprehending the impact of science and technology on the individual culture and society, such as:	Suggested Placement of Impact Objectives within Science Curriculum (K-3)(4-6)(7-9)(10-12)				Degree to Which the Objective Is Emphasized in the Present Science Program(s) Write in the Grade Level and Program Being Assessed: _____				
Impact Objectives									
1. Energy production and usage.	N	I	E	E	0	1	2	3	4
2. Health and well-being.	I	E	E	E	0	1	2	3	4
3. Jobs and careers.	N	I	E	E	0	1	2	3	4
4. Natural resource use and management.	I	E	E	M	0	1	2	3	4
5. All living organisms within populations.	I	E	E	E	0	1	2	3	4
6. Various modes of transportation.	N	I	E	E	0	1	2	3	4
7. Weather modification.	N	I	E	E	0	1	2	3	4
8. Genetic engineering.	N	N	I	E	0	1	2	3	4
9. Chemical development and usage.	N	I	E	E	0	1	2	3	4
10. Design and usage of computers.	N	I	M	E	0	1	2	3	4
11. Methods of communication.	I	M	E	E	0	1	2	3	4
12. The amount, control and usage of pollution.	I	M	E	E	0	1	2	3	4
13. Humankind aesthetically.	I	M	E	E	0	1	2	3	4
14. Living organisms' reaction to stress.	N	I	E	E	0	1	2	3	4
15. Use and/or misuse of drugs.	I	E	E	E	0	1	2	3	4
16. Humankind ethically.	I	E	E	E	0	1	2	3	4

Subgoal C

Impact Objectives	Suggested Placement of Impact Objectives within Science Curriculum (K-3)	(4-6)	(7-9)	(10-12)	Degree to Which the Objective Is Emphasized in the Present Science Program(s) Write in the Grade Level and Program Being Assessed: _____				
17. Housing.	I	E	E	E	0	1	2	3	4
18. Food and nutrition.	I	E	E	E	0	1	2	3	4
19. Use and/or misuse of land.	I	E	E	E	0	1	2	3	4
20. Amount and usage of leisure time.	I	E	E	E	0	1	2	3	4
21. Ventures in space.	N	I	E	M	0	1	2	3	4
22. Euthansia or mercy killing.	N	N	I	E	0	1	2	3	4
23. The ability of species to survive.	I	E	E	E	0	1	2	3	4
24. Artificially induced life.	N	N	I	E	0	1	2	3	4
25. Prosthetics or artificial body parts.	N	N	I	E	0	1	2	3	4

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Appendix

Grade Level(s), Subject

MATCHING LOCAL SCIENCE CURRICULUM NEEDS TO
AVAILABLE SCIENCE PROGRAMS

Use the following instrument to compare your local science curriculum needs to available programs being considered. Enter the names of the programs being considered on the diagonal lines at the top of the instrument. Using the Likert Scale below and the criteria on the vertical axis, rate each program by entering the appropriate number in each box.

0	1	2	3	4
Total Disagreement		General Agreement		Total Agreement

Science Programs Being Assessed:

Assessment Criteria										
Philosophy										
Goal										
Subgoal - Processes Objectives										
Subgoal - Knowledge Objectives Life Science Earth Science Physical Science										
Subgoal - Impact Objectives										
OTHER FACTORS TO CONSIDER										
Copyright Date										
Student Evaluation Criteria (Behavioral objectives, tests, etc.)										
Required Material Availability/ Replacement										

Science Programs Being Assessed:

Assessment Criteria										
Natural Resources and Environmental Awareness Concepts										
Math Concepts										
Health Concepts										
Reading Level										
Title IX Consistency										
Consistent with Multicultural, Nonsexist education requirement (Code of Iowa) 257.25(11) 670-3.5(257)										
Cosmetic Appearance										
Teacher's Edition (Scope/sequence, alternative teaching strategies, etc.)										
Inservice Required Physical Plant, Facilities										
Limitations (gas, water, electricity, hardware, etc.)										
Supportive Materials Available (audiovisuals, lab manuals, software, etc.)										
Career References										
Material appropriate to intellectural levels of Students										
Program is Sequential and Articulated										
Level of Teacher Commitment Required										
Integration with Other Science Programs Possible										
POINT TOTALS										